

## Examples of transformation rules

## Rotation rules

$$R_{(x^{\circ}, Q)}(\triangle ABC) = \triangle A'B'C'$$

$\downarrow \downarrow$  degrees rotated  
rotation

## Dilation rules

$$D_{(n, C)}(\triangle ABC) = \triangle A'B'C'$$

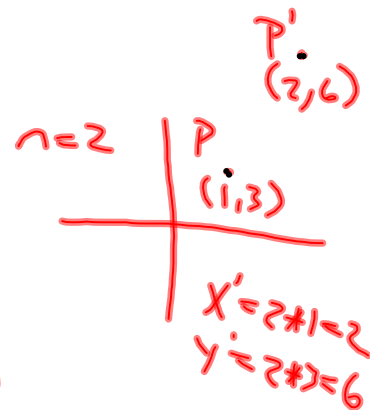
Use this form to write your rule.

scale factor  $\rightarrow$  center of dilation (or Q)

$$D_n(x, y) = (nx, ny)$$

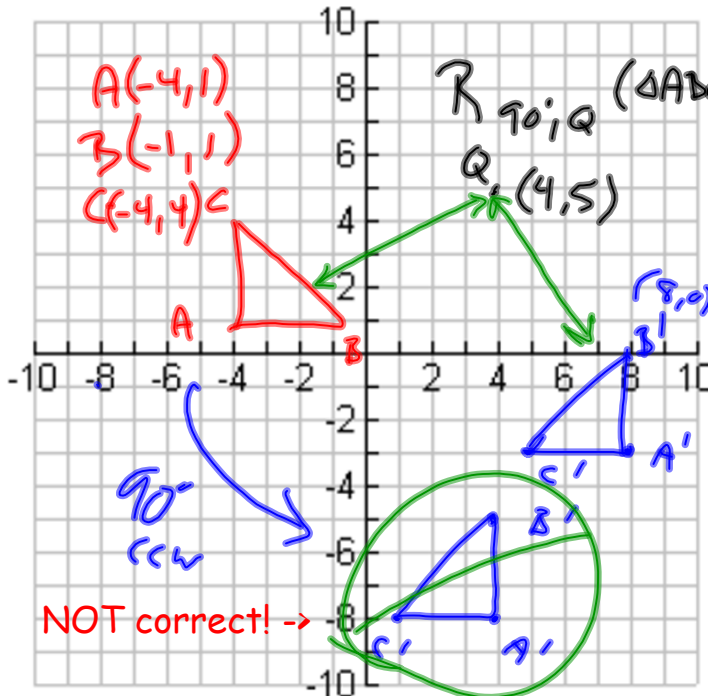
Use this form to help implement a rule.

$\downarrow$  short cut



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## Rotations - center of rotation is not the origin



$$R_{90^{\circ}, Q}(\triangle ABC) \rightarrow R_{90^{\circ}}(x, y) \rightarrow (-y, x)$$

$$A_Q(-8, -4)$$

distance  
from Q!

$$B_Q(-5, -4)$$

$$C_Q(-8, -1)$$

$$A'_Q(4, -8)$$

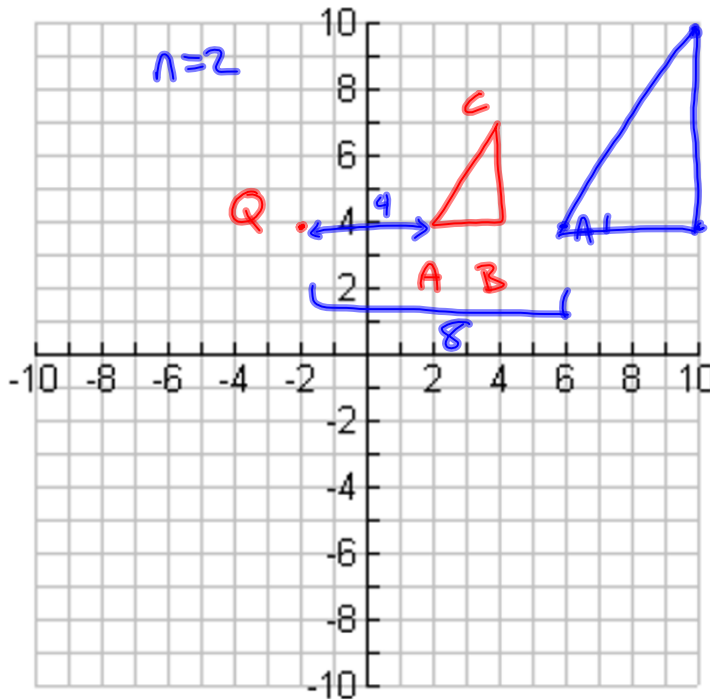
$$B'_Q(4, -5)$$

$$C'_Q(1, -8)$$

distance  
from Q!

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## Dilations - center of dilation is outside object



$$n = \frac{QA'}{QA} \quad \frac{\text{new}}{\text{old}}$$

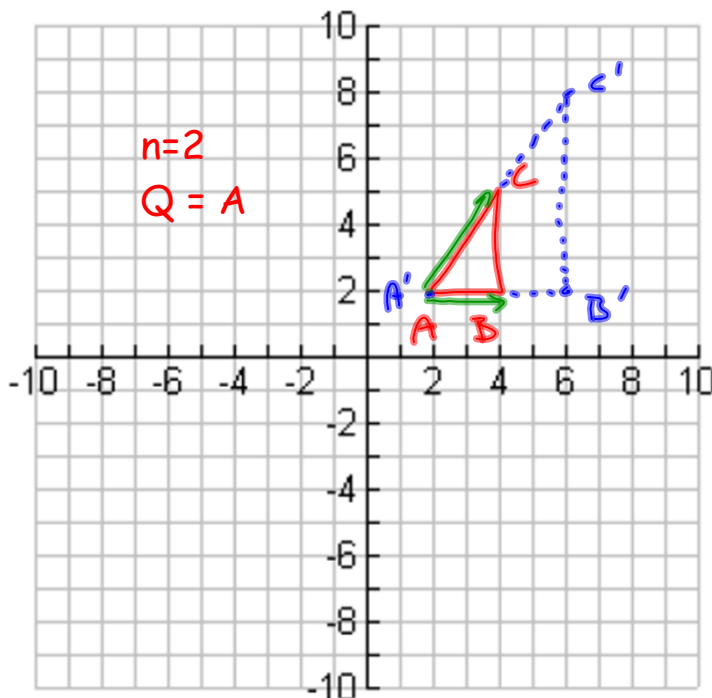
$$\overline{QA'} = n * \overline{QA} \\ = 2 * 4 = 8$$

$$QB' = 2 * 6 = 12$$

$$QC' = 2 * 6 \text{ right} \\ \quad \quad \quad 3 \text{ up} \\ = 12 \text{ right} \\ \quad \quad \quad 6 \text{ up}$$

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## Dilations - center of dilation is a vertex



$$QA' = 2 * QA$$

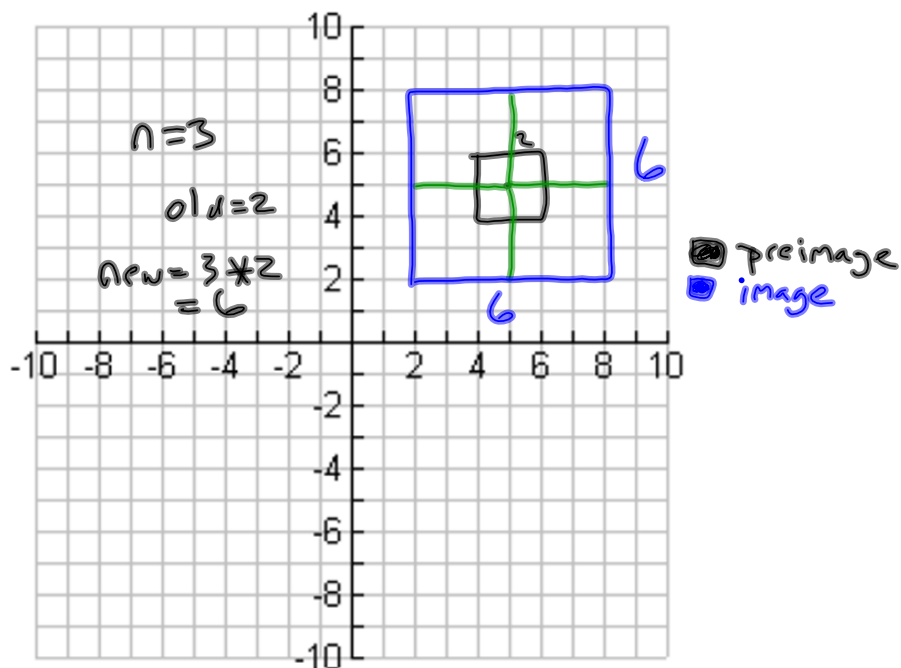
$$QA' = 0$$

$$QB' = 2 * 2 = 4$$

$$QC' = 2 * 2 \text{ right}, 3 \text{ up} \\ = 4 \text{ right}, 6 \text{ up}$$

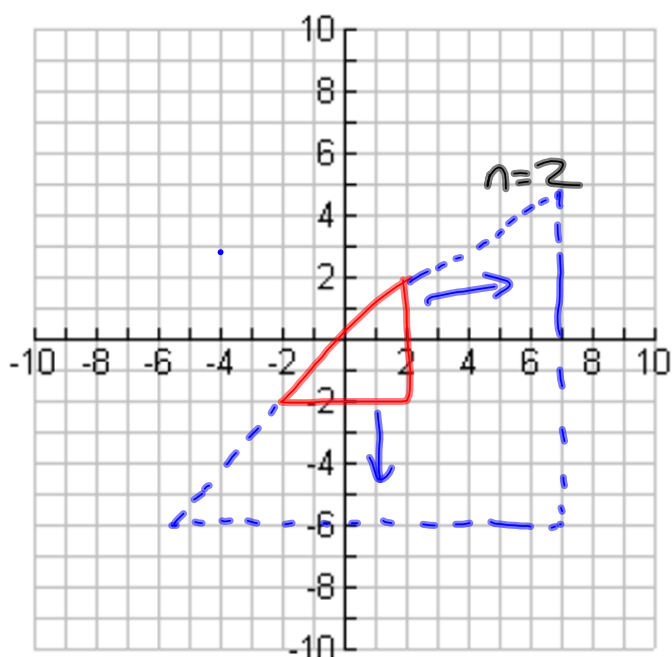
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Dilations - center of dilation is the center of the object.



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Dilations - when the origin is involved



$$D_n(x,y)=nx,ny$$

If  $x$  or  $y = 0$   
 then  $nx$  or  $ny=0$

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## Similarity and Congruence

What does congruence mean when talking about polygons and transformations?

\* rigid motion

- 1) translation
- 2) rotation
- 3) reflection

What does similarity mean when talking about polygons and transformations?

side ratios are =  
angles are =

4) dilation

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## Pop Quiz!

- 1) Write a translation rule that transforms an object left 3 and up 4.
- 2) Write a rotation rule that rotates an object 90 degrees counter-clockwise about the origin.
- 3) Write a reflection rule that reflects an object over the line  $y=2$ .
- 4) Write a dilation rule that dilates an object with a scale factor of 2 with a vertex from the object as the center of dilation.
- 5) Pick one of your rules and graph the preimage and image.

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